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Detecting Food Safety Problems Quickly

Faster is better when it comes to finding the source of food safety problems.

Food contamination can bring more than a passing stomachache. E. coli, for example, has been linked to severe illnesses and deaths around the world. A lack of rapid detection tests has aggravated the problem. The U.S. Department of Agriculture (USDA) and Land-Grant universities have come forward to help industry establish rapid detection methods and address emerging issues in food safety.

Payoff

- **Finding food-contaminating bacteria fast.** California researchers at UC-Davis developed a sensitive, reliable test for *E. coli* that can be completed in 8 hours rather than the two days needed for current procedures. The test, which can detect even a single *E. coli* bacterium, can warn consumers more quickly about this deadly contaminant. Now, researchers are experimenting with extending the test strategy to *Vibrio vulnificus*, a bacterium associated with seafood, and *Salmonella*, associated with poultry. Louisiana State's Rapid Microbial Detection and Food Safety Assurance Laboratory offers fast turnaround on microbial testing and also trains meat processors and food manufacturers in food safety. Dairy companies are benefiting from Penn State's simple test for *Listeria monocytogenes*, a bacterium in some dairy products that is injured but not killed during pasteurization. The test quickly identifies the bacterium, which causes a rare but deadly illness with a fatality rate of more than 30 percent. Past tests took more than a week to complete.
- **Farm tests prevent the spread.** Fast detection of *Salmonella* at the farm level will help the poultry industry prevent the disease before birds reach processors and ultimately consumers. A new procedure developed by Texas researchers samples air and tests for specific pathogens, providing results in less than a day rather than the three to seven days required for standard methods. A Nebraska researcher is working to improve the sensitivity of tests that detect *E. coli* in manure on farms. Knowing which cattle harbor *E. coli* in their intestines is the

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first step toward preventing the bacterium from reaching food supplies. **Auburn** researchers developed a rapid diagnostic test for *reovirus* infections in chickens. The test is being adapted to detect other poultry viruses—a major breakthrough for the diagnosis of all viral diseases in poultry.

- **A nose for safety.** A computer model developed at **Virginia** will help food processors determine the potential safety of a new product before they introduce it. The model predicts the effects of food ingredients on the growth of *Staphylococcus aureus* and the effects of heat on *Listeria monocytogenes*. This information will save time and money in bringing new foods to market. **Ohio State** researchers studied three types of electronic “noses” to determine whether these computerized sensors, which determine food quality with sensory chambers, really work. With this technology, processors can test hundreds of samples a day rather than the handful that humans can test accurately in that time.

- **Cook bacteria out.** Simply making sure that meat is cooked properly can prevent foodborne illness. **Michigan State** developed a simple test to determine whether meat and poultry have been cooked sufficiently. Food workers simply drop meat juices on the test paper, which changes color like litmus paper to reveal the presence of harmful bacteria.

- **Keeping pesticides out of the process.** Tests developed by researchers in **Maine** help food processors check for pesticide residues in processed foods. The immunoassay methods are used to detect the fungicides carbendazim and thiabendazole. The tests also check for hexazinone in water and maleic hydrazine in potatoes and onions.

- **Get the lead out.** Research by **Vermont** scientists is keeping maple syrup sweet. The researchers linked recent lead contamination in syrup to older equipment, including buckets, spouts, and pumps. Extension specialists are spreading the word to producers. The information is vital to the state’s 2,500 maple producers, who contribute \$110 million annually to Vermont’s economy.

- **The fungus is not among us.** Molds rot fruits and vegetables by breaking down cell walls. Scientists at **Oklahoma State** are developing plants that will trick molds into thinking there are no cell walls. Without sensing the cell walls, molds will not produce the enzymes that destroy foods.

- **Making sure you get what you pay for.** At **Auburn**, researchers are making sure that if you buy all-beef sausage, you get all-beef sausage. The researchers have developed an improved test that determines the type of meat in a product, so that people with allergies or religious concerns can “rest easy” when they buy sausages or meat products. The new, faster test costs 50 percent less than the present test.



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